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# PHYSICAL AND ANALYTICAL ELECTROCHEMISTRY DIVISION (PAED) NEWSLETTER

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May 2011

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Division Website: [www.electrochem.org/ecs/tia/paed/paed.htm](http://www.electrochem.org/ecs/tia/paed/paed.htm)

## **Division Officers (2009-2011)**

<b>Chair:</b>	Dr. Paul Trulove <a href="mailto:trulove@usna.edu">trulove@usna.edu</a>
<b>Vice-Chair:</b>	Dr. Shelley Minteer <a href="mailto:minteers@slu.edu">minteers@slu.edu</a>
<b>Secretary:</b>	Dr. Robert Mantz <a href="mailto:robert.a.mantz@us.army.mil">robert.a.mantz@us.army.mil</a>
<b>Treasurer:</b>	Dr. Pawel Kulesza <a href="mailto:pkulesza@chem.uw.edu.pl">pkulesza@chem.uw.edu.pl</a>
<b>Members-at-Large:</b>	
Dr. Mark Anderson	<a href="mailto:mark.anderson@cudenver.edu">mark.anderson@cudenver.edu</a>
Dr. Stanley Bruckenstein	<a href="mailto:chemstan@buffalo.edu">chemstan@buffalo.edu</a>
Dr. Shaowei Chen	<a href="mailto:schen@chemistry.ucsc.edu">schen@chemistry.ucsc.edu</a>
Dr. David Cliffel	<a href="mailto:d.cliffel@vanderbilt.edu">d.cliffel@vanderbilt.edu</a>
Dr. Alanah Fitch	<a href="mailto:afitch@luc.edu">afitch@luc.edu</a>
Dr. Andrew Hillier	<a href="mailto:hillier@iastate.edu">hillier@iastate.edu</a>
Dr. Petr Vanysek	<a href="mailto:pvansek@niu.edu">pvansek@niu.edu</a>
<b>Advisor to the PAED:</b>	
Dr. Patrik Schmuki	<a href="mailto:schmuki@ww.uni-erlangen.de">schmuki@ww.uni-erlangen.de</a>
<b>Newsletter Editor:</b>	Robert Mantz

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## **Recent Activities**

### **Symposia**

The division was a very active sponsor and co-sponsor of symposia during the last year. At the Fall 2010 meeting in Las Vegas, the division sponsored or co-sponsored 10 symposia and at Spring 2010 Meeting in Montreal, the division sponsored or co-sponsored 9 symposia. The division also provided financial support to many of the symposia it sponsored or co-sponsored in. As a division we provided \$7,500 in supporting funds to help organizers assist in the travel of speakers. A list of these symposia appears later in this newsletter. The PAED also has an impressive slate of symposia for the next few meetings, and a list of these also appears at later in this newsletter.

Individuals wishing to submit symposia topics for future meetings should contact Robert Mantz, [robert.a.mantz@us.army.mil](mailto:robert.a.mantz@us.army.mil)

ECS President William Brown presented Austen Angell Hugh De Long with the Max Bredig Award at the 218<sup>th</sup> ECS Meeting in Las Vegas.



## Last PAED Luncheon

PAED chair Paul Trulove presented Hugh De Long with a certificate of appreciation for his contributions to PAED including being the previous chair.



## **Student Travel Awards**

### **Las Vegas, NV, October 2010**

Five students received travel awards for the 2010 Fall Meeting in Las Vegas, NV. The awardees and their University affiliations are:

1. Muhammad Tahir Soomro, Institute of Physical and Theoretical Chemistry, Graz University of Technology, Austria
2. Jessica Alice O'Brien, University of Newcastle, Australia
3. Haizhou Liu, University of Washington, USA
4. Noreen Siraj, Institute of Physical and Theoretical Chemistry, Graz University of Technology, Austria

### **Montreal, Canada, May 2011**

Students that received travel awards through PAED for the 2011 Spring meeting in Montreal, Canada, will be announced during the PAED luncheon.

## **Requesting Member Opinions**

The PAED Chair (Paul Trulove, trulove@usna.edu ) is soliciting the membership for both new symposia topics and members to help organize future symposia. This is a perfect opportunity for member to serve their professional community and gain insight into the operation of their society.

## **PAED Awards**

### **David C. Grahame Award**

The David C. Grahame Award is one of two awards given by the Physical and Analytical Electrochemistry Division. It was established in 1981 through the sponsorship of General Electric and the Ford Foundation to encourage excellence in physical electrochemistry research. The award is given in the spring of odd-numbered years and consists of a scroll and prize of \$1,500

The Award Rules specify that, "The David C. Grahame Award shall be granted to a currently Active Member of the Society upon some recent outstanding scientific contribution to physical electrochemistry. For the purpose of the Award, currently active is to be measured by publication of more than one paper in the Journal and attendance at more than one Society meeting, as a member of the Society, within the previous five years."

Masatoshi Osawa is the 2011 recipient of the award for his outstanding contributions in the field of physical electrochemistry through the development of Surface-Enhanced Infrared Absorption Spectroscopy (SEIRAS), a powerful infrared spectroscopy for electrochemistry.

Award packages for the next selection cycle are due to Paul Trulove on 1 Oct 2011. The next award will be presented at the ECS spring meeting in Toronto, Canada, May 12-17, 2013.

### **Max Bredig Award in Molten Salt Chemistry**

The Max Bredig Award in Molten Salt Chemistry is the other award given by the Physical and Analytical Electrochemistry Division. It was established in 1984 through the sponsorship of ARCO Metals Company and the Aluminum Company of America in order to recognize excellence in molten salt chemistry research and to stimulate publication of high quality research papers in this area in the Journal of The Electrochemical Society. The awarded is granted to a scientist working in the area of molten salt chemistry to recognize important scientific contribution(s) to molten salt chemistry.

The Award will consist of a certificate the recipients receives a check payable to him or her for the sum of at least \$1,500. The recipient is required to attend the Society meeting at which the Award is given and to present an Award lecture, which will be given at the International Molten Salt Symposium sponsored by the Physical and Analytical Electrochemistry Division at that meeting.

Austen Angell was the recipient of this award at the Fall 2010 meeting in Las Vegas.

Award packages for the next selection cycle were due to Paul Trulove on 31 Jan 2011. The next award will be presented at the ECS fall meeting in Honolulu, Hawaii, October 7-12, 2012.

## **Past and Current Symposia**

### **Las Vegas Sponsored Symposia**

B4 - Electrode-Electrolyte Interfaces in Li-ion Batteries (B. Liaw and R. Kostecki)

B6 - Non-Aqueous Electrolytes for Lithium Batteries (B. Lucht, W. Henderson, T. R. Jow and M. Ue)

B7 - Polymer Electrolyte Fuel Cells 10 (H. Gasteiger, F. Büchi, D. Chu, S. Cleghorn, R. Darling, T. F. Fuller, M. Inaba, D. Jones, C. Lamy, R. Mantz, S. R. Narayan, V. Ramani, T. Schmidt, P. Shirvanian, P. Strasser, H. Uchida, A. Weber and T. A. Zawodzinski)

B9 - Solid State Ionic Devices 8 - NEMCA (E. D. Wachsman, C. Bock, G. Hunter and E. Traversa)

I1 - Physical and Analytical Electrochemistry General Session (S. Minteer)

I2 - Electrochemistry in Nanospaces (T. Ito and L. Baker)

I3 - International Symposium on Molten Salts and Ionic Liquids 17 (D. M. Fox, H. C. De Long, W. Henderson, R. Mantz, M. Mizihata and P. C. Trulove)

I4 - Oscillations and Pattern Formation in Electrochemistry (I. Z. Kiss and H. Varela)

I5 - Professor V. S. Bagotsky: 65 Years in Theoretical Electrochemistry, Electrocatalysis, and Applied Electrochemistry (B. MacDougall, C. Bock, E. Shembel and K. Zaghib)

J3 - Microfabricated and Nanofabricated Systems for MEMS/NEMS 9 (P. Hesketh, J. Davidson, A. Londergan, S. Shoji, P. Srinivasan and P. Vanysek)

### **Montreal Sponsored Symposia**

B2 - Direct Alcohol Fuel Cells (S. R. Narayan and T. Zawodzinski)

F2 - Surfactant and Additive Effects on Thin Film Deposition and Particle Growth 2 (T. P. Moffat and J. A. Switzer)

G2 - Characterization of Porous Materials 3 (B. Lakshmanan, G. Brisard, A. Lasia and V. Sethuraman)

G3 - Electrosynthesis and Electrochemical Processes, in Honor of W. Ves Childs (J. Weidner, I. Fritsch and D. T. Mah)

I1 - Bioelectrocatalysis (S. Minteer, P. Atanassov and S. Calabrese Barton)

I3 - Computational Electrochemistry (S. J. Paddison)

I4 - Electrocatalysis 5 (G. Brisard, V. Ramani and A. Wieckowski)

I5 - Grahame Award Symposium and Physical and Analytical Electrochemistry General Session (S. Minteer)

I6 - Nanostructured and Functionalized Electroactive Polymer Films and Related Materials 2 (P. Kulesza, D. Hansen and C. Kranz)

## **UPCOMING SYMPOSIA**

### **220<sup>th</sup> Meeting – Boston, MA** **October 9-14, 2011**

The Executive committee of the Physical and Analytical Electrochemistry Division cordially invites you to participate at the fall 2011 Meeting, which will be held October 9 – October 11 in Boston, MA. There will be 10 symposia where the Physical Division is either the organizer or a co-organizer.

#### **PAED Sponsored and Co-Sponsored Symposia**

**A4 - Grand Challenges in Energy Conversion and Storage (Electrodeposition / Energy Technology / Physical and Analytical Electrochemistry / Battery / Industrial Electrochemistry and Electrochemical Engineering / High Temperature Materials / Sensor) Electrode-Electrolyte Interfaces in Li-ion Batteries (Battery / Physical and Analytical Electrochemistry)**

The symposium will provide a forum for the presentation of new and exciting research of interest to the energy science, electrochemical, and materials chemistry communities. The global energy issues cover many interdisciplinary fields including carbon-free generation of energy (photovoltaics and wind), affordable energy storage for automotive traction, and scalable storage solutions for large stationary applications (including grid-level needs as well as the intermittency of solar and wind). New electrochemical approaches to primary extraction or recycling of critical materials, e.g., silicon for PVs, hydrogen for PEM fuel cells, etc., are also of interest.

The hope is to run a symposium lasting two days and comprised of 40-minute invited lectures. Our intent is



to highlight the most recent and perhaps controversial research topics and to promote discussion in these areas.

An issue of ECS Transactions is planned to be published "AFTER" the meeting. All authors accepted for presentation are obligated to submit their full text manuscript for the issue no later than November 18, 2011. All manuscripts will be submitted online, and must be in either MS Word or PDF format.

Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: D. R. Sadoway, MIT, e-mail: dsadoway@mit.edu; Y. Fukunaka, JAXA & Waseda University, e-mail: hirofukunaka@gmail.com; R. Mukundan, Los Alamos National Laboratory, e-mail: mukundan@lanl.gov; and X-D. Zhou, University of South Carolina, e-mail: zhox@cec.sc.edu.

### **B10 - Polymer Electrolyte Fuel Cells 11 (Energy Technology / Physical and Analytical Electrochemistry / Battery / Industrial Electrochemistry and Electrochemical Engineering / Corrosion)**

This international symposium is devoted to all aspects of research, development, and engineering of polymer electrolyte fuel cells (PEFCs), as well as low-temperature direct-fuel cells using either anion or cation exchange membranes. The intention is to bring together the international community working on the subject and to enable effective interactions between research and engineering communities. The symposium is structured as five different sections: diagnostic techniques and systems design/components for both acid and alkaline fuel cells, catalysts and membranes for acid fuel cells, and catalysts and membranes for alkaline fuel cells.

Abstracts for oral or poster contributions must be submitted to the symposium via the ECS website; please send a copy of your abstract to the respective Section Organizers (please cc the Lead Editor). Since the number of time slots for oral presentations are limited, we would appreciate if research groups that submit several abstracts could seek a reasonable balance between oral and poster contributions. If you are submitting multiple abstracts for oral contribution to the same Section, please send a prioritized list to the Section Organizers of that Section, since in this case we might have to move one or more of the oral contributions into the Poster Session, depending on how closely the papers overlap.

#### Section A: Diagnostics/Characterization Methods, MEA Design/Model Organizers: H. A. Gasteiger, F. Buchi, V. Ramani, A. Weber

Presentations related to acid and alkaline fuel cells that discuss: (1.) novel gas diffusion medium substrates and microporous layer designs; (2.) modeling and diagnostic methods to characterize mass- and heat-transport related phenomena (e.g., water flooding) in cells and membrane electrode assemblies; (3.) CO<sub>2</sub> tolerance modeling of anion-exchange membrane fuel cells; (4.) in situ measurement or visualization (X-ray tomography, neutron scattering, etc.); (5.) advanced ex situ characterization methods (TEM, STM); (6.) AC-impedance methods; and (7.) electrode and MEA electrochemical modeling.

#### Section B: Fuel Cell Systems, Stack/BOP Design, Gas Processing Organizers: P. Shirvanian, T. Fuller, S. R. Narayanan, A. J. Davenport

Presentations related to acid and alkaline fuel cells that discuss: (1.) hydrogen or hydrogen-reformate fuel cells; (2.) direct-fuel fuel cells (DMFC, borohydride, etc.); (3.) alkaline (membrane) fuel cells; (4.) portable

fuel cells; (5.) new cell and stack structures, including new types of bipolar plates and flow fields; (6.) degradation of fuel cell components and the influence of degradation products on component and system performance, including corrosion of bipolar plates and BOP, and degradation of sealing materials and other components; (7.) hydrogen-reformate synthesis; (8.) balance-of-plant (BOP) components; and (9.) design and specifications of complete power systems in the context of transportation and stationary power generation applications as well as for micro-fuel cell systems.

#### Section C: Cation-Exchange Membrane Performance & Durability

Organizers: H. Nakagawa, M. Edmundson, D. Jones

Presentations related to acid fuel cells that discuss: (1.) advanced cation-exchange membranes and ionomers (PFSA, hydrocarbon-based, etc.); (2.) high-temperature membranes; (3.) physical-chemical properties of fuel cell membranes; (4.) structural characterization of membranes; (5.) degradation/aging of membranes (chemical and mechanical); and (6.) molecular modeling of membrane properties.

#### Section D: Catalyst Activity/Durability for Acid Fuel Cells

Organizers: H. Uchida, C. Lamy, S. Mukerjee, P. Strasser

Presentations related to acid fuel cells that discuss: (1.) fuel cell electrocatalysts for hydrogen and hydrogen-reformate fuel cells; (2.) fuel cell electrocatalysts for direct-fuel fuel cells (e.g., methanol, ethanol, etc.); (3.) novel catalyst supports; (4.) degradation of fuel cell electrocatalysts and catalyst supports; and (5.) ab initio computational studies of catalytic mechanisms and for the design of novel catalysts.

#### Section E: Alkaline Fuel Cell Membranes and Catalysts

Organizers: R. Mantz, K. Swider-Lyons, T. J. Schmidt

Presentations related to alkaline fuel cells that discuss: (1.) electrocatalysts for hydrogen oxidation and oxygen reduction; (2.) catalysts for the direct electrooxidation of alternative fuels (e.g., methanol, ethanol, ammonia, etc.); (3.) catalysts for direct-borohydride applications; (4.) novel anion-exchange membranes; and (5.) degradation mechanisms of anion exchange membranes.

A hard-cover issue of ECS Transactions is planned to be available "AT" the meeting. All authors accepted for presentation are obligated to submit their full text manuscript for the issue no later than July 1, 2011. All manuscripts will be submitted online, and must be in either MS Word or PDF format.

Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: Section A: H. A. Gasteiger (Lead Editor), Technische Universität München, Germany, e-mail: [hubert.gasteiger@tum.de](mailto:hubert.gasteiger@tum.de); F. N. Büchi, Paul Scherrer Institut, Switzerland, e-mail: [felix.buechi@psi.ch](mailto:felix.buechi@psi.ch); V. Ramani, Illinois Institute of Technology, Chicago, USA, e-mail: [ramani@iit.edu](mailto:ramani@iit.edu); and A. Weber, Lawrence Berkeley National Laboratory, USA, e-mail: [azweber@lbl.gov](mailto:azweber@lbl.gov). Section B: P. Shirvanian, Ford Motor Co., USA, e-mail: [ashirvan@ford.com](mailto:ashirvan@ford.com); T. Fuller, Georgia Institute of Technology, Atlanta, USA, e-mail: [tom.fuller@gtri.gatech.edu](mailto:tom.fuller@gtri.gatech.edu); S. R. Narayanan, Univ. of Southern California, Los Angeles, CA, USA, e-mail: [srnaraya@college.usc.edu](mailto:srnaraya@college.usc.edu); and A. J. Davenport, Univ. of Birmingham, UK, e-mail: [a.davenport@bham.ac.uk](mailto:a.davenport@bham.ac.uk). Section C: H. Nakagawa, AGC America, Inc., Mountain View, CA, USA, e-mail: [hakagawa@agcamerica.com](mailto:hakagawa@agcamerica.com); M. Edmundson, W. L. Gore & Associates, Elkton, MD, USA, e-mail: [medmunds@wlgore.com](mailto:medmunds@wlgore.com); and D. Jones, Université Montpellier, France, e-mail: [Deborah.Jones@univ-montp2.fr](mailto:Deborah.Jones@univ-montp2.fr). Section D: H. Uchida, University of Yamanashi, e-mail: [h-uchida@yamanashi.ac.jp](mailto:h-uchida@yamanashi.ac.jp); C. Lamy, Université de Poitiers, France, e-mail: [claudelamy@univ-poitiers.fr](mailto:claudelamy@univ-poitiers.fr); P. Strasser, Technical University

Berlin, Germany, e-mail: [pstrasser@tuberlin.de](mailto:pstrasser@tuberlin.de); and S. Mukerjee, Northeastern University, e-mail: [S.Mukerjee@neu.edu](mailto:S.Mukerjee@neu.edu). Section E: R. Mantz, U.S. Army Research Office, USA, e-mail: [robert.a.mantz@us.army.mil](mailto:robert.a.mantz@us.army.mil); K. Swider-Lyons, Navy Research Laboratory, USA, e-mail: [karen.lyons@nrl.navy.mil](mailto:karen.lyons@nrl.navy.mil); and T. J. Schmidt, BASF Fuel Cell GmbH, Germany, e-mail: [schmidt\\_tj@web.de](mailto:schmidt_tj@web.de).

In order to encourage active participation of new and talented researchers in the field, we anticipate awarding Student/Postdoc Travel Grants of at least \$500 and free registration in support of outstanding graduate students and postdoctoral fellows. Awards will be made based on originality of the work and importance to the field. To be considered for the award, an abstract for an oral or poster presentation as well as a manuscript for the symposium proceedings must be submitted by the respective deadlines. If you would like to apply for the travel grant, please submit your abstract, your proceedings manuscript, your resume, your publication list, and a support letter from your advisor to Adam Weber ([azweber@lbl.gov](mailto:azweber@lbl.gov)) before the deadline for the proceedings manuscript. Student Poster Prizes of a total of \$3,000 will be awarded with a \$1,000 top prize. Students who want to participate need to submit an abstract for a poster contribution to the ECS and send a copy of their abstract to Jim Fenton ([jfenton@fsec.ucf.edu](mailto:jfenton@fsec.ucf.edu)).

An ECS Short Course on Polymer Electrolyte Fuel Cells will be held on Sunday, October 9, taught by Thomas J. Schmidt and Hubert A. Gasteiger. It will cover relevant half-cell reactions, their thermodynamic driving forces, and their mathematical foundations in electrocatalysis theory. Different functional requirements of actual PEFC components and present in situ diagnostics will be covered. The course will describe the principles of fuel cell catalyst activity measurements, the impact of uncontrolled-operation events, and the various effects of long-term materials degradation. Materials challenges for Alkaline Membrane Fuel Cells (AMFCs) and Direct Methanol Fuel Cells (DMFCs) will also be reviewed.

### **B12 Electrochemical Processes for Fuels (High Temperature Materials / New Technology Subcommittee / Physical and Analytical Electrochemistry / Energy Technology)**

Sustainable economic growth and high quality of life require an abundant supply of clean and affordable energy. Future energy sources include solar, wind, and nuclear energy - all of which can produce electricity as the primary form of energy. The conversion of this electrical energy to fuels (e.g., hydrocarbon or hydrogen) using common chemicals such as carbon dioxide and water through electrochemical processes (e.g., electrolysis reactions), provides an opportunity to remove the temporal variation in the energy supply from solar and wind energy. Electrolysis reactions may involve protons, hydroxide, oxide or other ions. This symposium will provide an international forum for the presentation and discussion of the latest developments on electrolysis and related topics. The emphasis of this symposium is on recent advances relevant to the conversion and utilization of CO<sub>2</sub> and/or H<sub>2</sub>O for synthesis of fuels and other chemicals. The application of the same cells as fuel cells is of special interest, because reversible cells that may be coupled with renewable or nuclear electric power production in order to increase efficiency through energy storage are of particular importance.

Papers are solicited on the following topics: (1.) materials for solid oxide electrolysis cells (SOECs) and solid oxide fuel cells (SOFCs), including electrolytes, electrodes, seals, and interconnects as well as proton conductor electrolysis cells (PCECs) and fuel cells (PCFC). Also contributions about cells with immobilized liquid electrolytes at elevated temperatures are solicited; (2.) electrochemical performance and stability of SOECs/SOFCs, PCEC/PCFC and other relevant cells; (3.) electrocatalytic phenomena in oxygen electrodes

and fuel electrodes; (4.) photoelectrochemical approaches for conversion of CO<sub>2</sub> and/or H<sub>2</sub>O; (5.) electrochemical and chemical technologies for CO<sub>2</sub> separation; and (6.) novel materials or concepts for CO<sub>2</sub> conversion and capture.

An issue of ECS Transactions is planned to be published “AFTER” the meeting. All authors accepted for presentation are encouraged to submit their full text manuscript for the issue no later than November 18, 2011. All manuscripts will be submitted online, and must be in either MS Word or PDF format.

Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizer: X-D. Zhou, University of South Carolina, e-mail: xiao-dong.zhou@sc.edu; G. Brisard, University of Sherbrooke, Canada, e-mail: [Gessie.brisard@usherbrooke.edu](mailto:Gessie.brisard@usherbrooke.edu); M. Mogensen, Risoe National Laboratory, e-mail: momo@risoe.dtu.dk; and W. Mustain, University of Connecticut, e-mail: [Mustain@engr.uconn.edu](mailto:Mustain@engr.uconn.edu).

## **I1 Physical and Analytical Electrochemistry General Session (Physical and Analytical Electrochemistry)**

Papers concerning any aspect of physical electrochemistry not covered by topic areas of other specialized symposia at this meeting are welcome. Contributed papers will be programmed in some related order, depending on the titles and contents of the submitted abstracts.

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## **I2 Advances in Trace Analysis (Physical and Analytical Electrochemistry)**

A variety of different techniques have been used for electroanalytical sensing at the trace level. This symposium will highlight recent advances in the field, with a special emphasis on bringing together researchers working with different approaches. Topics of interest include, but are not limited, to the use of voltammetry, chronopotentiometry, potentiometry, and related techniques for the analysis of redox-active and redox-inactive analytes.

An issue of ECS Transactions is planned to be published “AFTER” the meeting. All authors accepted for presentation are encouraged to submit their full text manuscript for the issue no later than November 18, 2011. All manuscripts will be submitted online, and must be in either MS Word or PDF format.

Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizer: P. Buhlmann, University of Minnesota, e-mail: [buhlmann@umn.edu](mailto:buhlmann@umn.edu).

### **I3 Bioelectroanalysis (Physical and Analytical Electrochemistry / Sensor)**

Papers are solicited on fundamental and applied aspects of bioelectroanalysis: including the design, fabrication, and evaluation of biosensors and bioprobes as well as electrochemical lab-on-a-chip devices for bioanalysis and biomedical applications. All papers in electroanalytical techniques for biological molecules are invited, as well as papers focused on fundamental bioelectrocatalysis for sensing and analysis applications.

An issue of ECS Transactions is planned to be published "AFTER" the meeting. All authors accepted for presentation are encouraged to submit their full text manuscript for the issue no later than November 18, 2011. All manuscripts will be submitted online, and must be in either MS Word or PDF format.

Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: S. Minteer, Saint Louis University, e-mail: [mintees@slu.edu](mailto:mintees@slu.edu); and B. Chin, Auburn University, e-mail: [chinbry@auburn.edu](mailto:chinbry@auburn.edu).

### **I4 Electrochemistry at Nanoscale Dimensions 2 (Physical and Analytical Electrochemistry)**

Nanoscale materials and electrochemistry in nanospaces has been an ever-expanding research area over the last decade. This symposium will focus on the electrochemistry of nanoscale materials including: carbon nanotubes, nanowires, and nanoparticles. It will also focus on nanoscale electrodes and electrochemistry in nanoscale volumes. Special interest in the area of characterization techniques for studying the nanoscale dimension are also of interest.

An issue of ECS Transactions is planned to be published "AFTER" the meeting. All authors accepted for presentation are encouraged to submit their full text manuscript for the issue no later than November 18, 2011. All manuscripts will be submitted online, and must be in either MS Word or PDF format.

Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizer: D. Cliffell, Vanderbilt University, email: [d.cliffel@vanderbilt.edu](mailto:d.cliffel@vanderbilt.edu).

### **I5 Electrochemical Quartz Crystal Microbalance (Physical and Analytical Electrochemistry)**

A quartz crystal microbalance (QCM) is powerful technique that has been successfully applied in numerous research fields. Additionally, QCM can be coupled with many other techniques and provide complex in-situ transient measurements. The solicitation calls for fundamental and applied aspects of a quartz crystal microbalance technique. Besides others, the fundamentals cover the acoustic wave theory, response of shear mode piezoelectric resonators, properties and behavior of viscoelastic thin films, behavior of the resonators exposed to various media, computer modeling and equivalent circuits of the associated physical phenomena. The applied research with QCM is very broad, examples might include study and control of catalysts, metal films, and polymers deposition, self assembled monolayers, redox processes and intercalation in electrochemical sensors, energy storage and generation system. Other example might include biochemical study of proteins adsorption on quartz resonators, their stability and fouling, antibody affinity to antigens,

cells growth and adhesion on resonators, further research of DNA and immunosensors. Highly welcomed are also applied presentations in which QCM became the critical technique for ground a breaking research, invention, or provided the required evidence to conclude on a proposed hypothesis.

An issue of ECS Transactions is planned to be published "AFTER" the meeting. All authors accepted for presentation are encouraged to submit their full text manuscript for the issue no later than November 18, 2011. All manuscripts will be submitted online, and must be in either MS Word or PDF format.

Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizer: V. Svoboda, CFD Research Corporation, e-mail: vxs@cfdr.com.

## **I6 Electron Transfer Reactions at Organic/ Metal Interfaces 2 (Physical and Analytical Electrochemistry / Organic and Biological Electrochemistry)**

This symposium covers current issues related to the rates and mechanisms of heterogeneous electron transfer rate constants at metal and polymer coated (organic) interfaces. The reactions are not limited to electrode surfaces but may encompass the rates of electron transfer taking place at minerals substrates.

An issue of ECS Transactions is planned to be published "AFTER" the meeting. All authors accepted for presentation are encouraged to submit their full text manuscript for the issue no later than November 18, 2011. All manuscripts will be submitted online, and must be in either MS Word or PDF format.

Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: A. Fitch, Loyola University, e-mail: afitch@luc.edu; and M. Foley, US Naval Academy, e-mail: foley@usna.edu.

## **I7 Physical and Analytical Electrochemistry in Ionic Liquids 2 (Physical and Analytical Electrochemistry)**

This symposium will provide an international and interdisciplinary forum for researchers to present their latest research on topics involving physical and/or analytical electrochemistry in ionic liquids. Papers on both basic and applied research are encouraged. The topics will include, but are not limited to: (1.) electron transfer processes in ionic liquids; (2.) electrode kinetics in ionic liquids; (3.) the electrode/ionic liquid interface; (4.) electrochemical characterization of ionic liquids (e.g., conductivity, ion transport, electrochemical windows); (5.) experimental aspects of electrochemistry in ionic liquids; (6.) the electrochemistry of solutes in ionic liquids; (7.) electroanalytical determinations in ionic liquids; (8.) electrodeposition in ionic liquids (e.g., nucleation, deposition of alloys, characterization of electroactive species, and surface characterization); and (9.) electrochemical aspects of biological materials and systems in ionic liquids.

An issue of ECS Transactions is planned to be published "AFTER" the meeting. All authors accepted for presentation are encouraged to submit their full text manuscript for the issue no later than November 18, 2011. All manuscripts will be submitted online, and must be in either MS Word or PDF format.

Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: P. C. Trulove, U.S. Naval Academy, Annapolis, MD, e-mail:

trulove@usna.edu; H. C. De Long, Air Force Office of Scientific Research, Arlington, VA, e-mail: hugh.delong@afosr.af.mil; and R. A. Mantz, Army Research Office, Research Triangle, NC, e-mail: robert.a.mantz@us.army.mil.

**221<sup>st</sup> Meeting – Seattle**  
**May 6 – 11 , 2012**

The Executive committee of the Physical and Analytical Electrochemistry Division cordially invites you to participate at the 221<sup>st</sup> Meeting of the Electrochemical Society, which will be held May 6 – 11, in Seattle, WA. There are currently nine tentative symposia where the PAED Division is either the organizer or co-organizer.

**PAED General Session**

Organizer: R. Mantz

**Exploiting Magnets in Electrochemistry**

Organizer: J. Leddy

**Biofuel Cells 5**

Organizer: S. Minteer

**Fundamental Aspects of the Electrochemical and Interfacial Properties of Carbon Nanostructures**

Organizer: Heidi Martin

**Electrocatalysis Applied to Fuel Cells and Electrolyzers**

Organizer - Pawel Kuleza

**Spectroelectrochemistry**

Organizers: Mukerjee & Wieckowski

**Electroanalytical Chemistry Applied to Biomedical Applications**

Organizer: David Cliffel

Cosponsoring

**Fundamental Aspects of Bioelectrochemistry**

PAED Organizer: Hugh De Long

**MEMS NEMS 9**

PAED Organizer: Peter Vanýsek

## **Future Meeting Dates**

Fall 2011  
Spring 2012  
Fall 2012  
Spring 2013  
Fall 2013  
Spring 2014

October 9 - 14  
May 6 – 11  
October 7 – 12  
May 12 – 17  
Oct 27 – Nov 1  
May 11 -17

Boston  
Seattle  
Honolulu  
Toronto  
San Francisco  
Orlando